MATERIALS SPECIFICATION FOR FLANGED RUBBER SEATED BUTTERFLY VALVES

1. General:

All valves supplied under this Specification shall be designed and manufactured in accordance with AWWA C504, with the following additional requirements or exceptions.

2. Service:

All valves shall be suitable for throttling service and/or frequent operation as well as service involving long periods of inactivity. Valves shall be capable of operating satisfactorily with flows in either direction. Valves shall be suitable for use in potable water service.

3. Installation:

All valves specified as buried shall be for buried service in horizontal waterlines with the valve shaft horizontal and operating nut shaft vertical. Body of valves will be buried and the actuators will be installed in manholes.

All valves specified as in-plant shall be for service inside buildings or other structures in a relatively dry environment, protected from weather. The valves will be installed with valve shaft horizontal and the actuator directly coupled to the valve body.

4. Shut Off Pressure:

The maximum static differential pressure across the valve will be 150 psi. At this rated pressure the valve shall be bubble tight for flows in either direction.

5. Class of Valve:

All valves shall be Class 150B.

6. Valve Bodies:

Valves shall be of short body pattern with laying lengths as shown in Table 2 of AWWA C504. Disc stops on the body will not be allowed.

7. Valve Discs:

Valve discs shall conform to that shown in 3.4 of AWWA C504. Valve disc shall seat at 90 degrees to the pipe axis.

8. Valve Seat:

Rubber seats may be applied to either the body or the disc. The mating seat surface, in either case, shall be stainless steel in accordance with AWWA C504 2.2.4 or sprayed in accordance with AWWA C504 3.5.3.3. Plated mating-seat surfaces will not be acceptable.

Rubber seats shall be of new natural or synthetic rubber and may be reinforced by the manufacturer.

Rubber seats mounted on the disc shall be a continuous full circle seal and clamped thereon with corrosion resistant retaining rings and threaded fasteners which shall conform to all the requirements of 3.5 of AWWA C504.

Rubber seats mounted in the groove of the valve body on valves 24 inch diameter and smaller may be bonded to the body. Bonded seats must withstand a 75 pound pull in accordance to the 90° stripping test procedure Method B of ASTM D 429.

Rubber seats mounted in the valve body on valves larger than 24 inch shall be full circle and shall be retained in the valve body by mechanical means in such a manner that the seat can be adjusted to provide the required shutoff. All hardware used in retaining the seat in the body shall conform to all the requirements of 3.5 of AWWA C504. Valve shaft shall not penetrate the rubber seat.

9. Valve Shaft:

Valve shaft shall be stainless steel and may be either through or stub type and shall conform to all applicable requirements of 3.3 of AWWA C504.

10. Shaft Seal:

Where the valve shaft projects through the valve body for the actuator connection, a shaft seal designed for positive pressure within the valve shall be provided for the following sizes of valves:

A) For valves 24 inch diameter and smaller:

The seal shall be one of the following types:
1) Self-compensating V-type packing.
2) O-ring type contained in a corrosion resistant cartridge.

Retention of the above seals shall be designed to utilize the actuator case as a positioner of the seal. Replacement of seals shall be done without removal of the valve shaft.

B) For valves 30 inch diameter and larger:

1) V-type packing
2) Pull-down type

Retention of the above seals shall be designed to utilize a stuffing box and pull down packing gland so that the packing can be field adjusted or completely replaced without disturbing any part of the valve or actuator assembly, except the packing gland follower.

3) O-ring type contained in a corrosion resistant cartridge, replaceable without removal of the valve shaft.

On buried valves, the shaft seal area and exposed valve shaft shall be totally enclosed to prevent infiltration of material around the shaft seal and valve shaft during backfilling. Adjustable packing glands shall be accessible either through the bonnet as specified below or by removing the enclosure around the packing gland.

11. Valve Bearings:

Valve bearings shall conform to all applicable requirements of 3.6 of AWWA C504. In addition, valves furnished with externally adjustable thrust bearing shall have the external adjusting mechanism enclosed in a substantial watertight housing.

12. Type of Valve Ends:

All valves shall be furnished with flanged ends. Dimensions and drilling shall be in accordance with ANSI B 16.1 Class 125. Flanges shall be machined to a flat surface with a serrated finish in accordance with 3.02 of AWWA C207.

13. Valve Actuators:

Unless otherwise specified valves shall be furnished with manual actuators designed and sized to develop output torques for Class 150B operating service and shall be sufficient to seat, unseat and rigidly hold the disc in any intermediate position for the above conditions. The maximum velocity for actuator design shall be l6 fps.

A) Buried Valves

The actuators shall be designed to operate temporarily in a submerged condition in ten feet of water. The actuators shall be equipped with 2 inch square operating nuts. The nuts shall be 1-15/16 inch square at the top, 2 inch square at the base, and 1-3/4 inch in height. The valves shall be opened with a clockwise rotation of the nut.

Stop-limiting devices shall be provided in the actuator for both open and closed positions. All actuator components between the input and the stops shall be designed to withstand, without damage, an input torque of 300 foot-pounds at the operating nut.

B) In-Plant Valves

The actuators shall be provided with handwheels of suitable size to open the valves with the specified maximum pull. The valves shall be opened with a clockwise rotation of the handwheel.

Stop-limiting devices shall be provided in the actuators for the open and closed positions. All actuator components between the input and these stops shall be designed to withstand, without damage, a pull of 200 lb. on the handwheel.

All gearing of the manual actuator shall be totally enclosed and sealed for a lubricant formulated for a temperature range of -10°F to +150°F. Manufacturer shall fill the gear case with lubricant to 80% of full prior to shipment from the factory.

Primary gearing of actuator shall be a self locking worm gear of high tensile bronze and a worm of hardened alloy steel with ground and polished threads.

Primary gearing shall be supplemented by spur gear attachment to comply with the following conditions of operation for all sizes of valves:

1. Minimum number of turns for complete opening or closing of valve disc shall not be less than 40 for all buried valves.

2. Maximum input torque required to fully open or close the valve for Class 150B conditions shall not exceed 150 foot-pounds when applied to the operating nut, or an 80-pound pull when applied to the handwheel.

The diameter of the output shaft or spline of the actuator shall be sized equal to or greater than the turned-down section of the valve shaft as provided in 3.3 of AWWA C504.

All actuators shall have a valve position indicator.

14. Valve Bonnet:

Buried valves shall be furnished with a separate one piece cast iron or fabricated steel extension bonnet with (if applicable) access openings fitted with removable covers, located to permit access to the stuffing box for tightening the packing. The extension bonnet shall be of sufficient length to extend the distance between the valve centerline and operating nut an additional 21 inches over the distance which could be considered standard and shall be of a single diameter over its entire length. Minimum thickness of removable cover shall be 14 gauge and shall be attached to extension sleeve with a minimum of four 1/4 inch diameter cap screws. Gasketing of the opening is not required.

15. Nameplates:

Corrosion-resistant nameplates conforming to 6.1 of AWWA C504 shall be permanently attached to both the valve and valve actuator. There shall be two valve nameplates, one attached to the valve body and the other shall be attached to the valve actuator. The valve nameplates shall include the normal valve data and the number of turns required to operate the valve. There shall be one actuator nameplate attached to the valve actuator.

16. Testing:

The valve manufacturer shall test all valves according to 5.0 of AWWA C504 and shall furnish 3 certified copies of the reports on the Performance test, the Leakage test, and the Hydrostatic test.

If the valve is not functioning properly at the time of installation, the Manufacturer shall furnish a duly authorized service person to repair or adjust the valve to the satisfaction of Denver Water at no additional cost to Denver Water.

17. Affidavit of Compliance:

The manufacturer of valves supplied under this Standard shall furnish an affidavit of compliance in accordance with 1.7 of AWWA C504 stating that all valves furnished comply with all applicable provisions of AWWA C504 as modified or supplemented herein. Calculations necessary to size operators shall be submitted to Denver Water upon request.

18. Painting:

A) Internal surfaces. All internal ferrous surfaces except finished or bearing surfaces shall be prepared for coating by sandblasting to a near white metal finish per SSPC-SP-10. These surfaces shall then be coated with a two-part thermosetting polyamide epoxy in two or more uniform coats to a minimum dry film thickness of 12 mils. Epoxy coating shall conform to AWWA C550 and shall be Amerlock 400, Tnemec Series 140F Pota-Pox Plus or equal.

B) External surfaces. All exterior surfaces except finished or bearing surfaces shall be carefully prepared by removing all dirt, grease, and rust and shall be cleaned to the extent that the coating will bond to all surfaces.

For buried valves, the exterior of each valve shall be shop coated with two coats of asphalt varnish, Federal Specification TT-C-494A.

For in-plant valves, the exterior of each valve except flange faces shall be shop coated with two coats of chromate conforming to Federal Specification TT-P-645A to a dry film thickness of not less than 3 mils.

Flange faces shall be shop coated with a rust preventive compound.

After above painting is completed, a lubricant compatible with the rubber seal shall be applied to surface of this seal and the mating metal surface to prevent bonding of the two surfaces during shipment and storage. Following application of the seal lubricant, the valve disk shall be placed in a slightly open position for shipment.

19. Certification:

The manufacturer shall furnish a sworn statement that the inspection and all of the specified tests have been made, and the results thereof comply with the requirements of the applicable Standard(s) herein specified. A copy of the Certification including compliance with NSF Standard 61 shall be sent to Denver Water.

20. Acceptable Manufacturers:
CMB/K-Flo

Mueller
Pratt
Rodney Hunt
Dezurik